

Appl. No. 10/759,954

RECEIVED
CENTRAL FAX CENTER
SEP 11 2006**REMARKS**

Claims 1-3 and 5-15 remain in this application. Claims 4 and 16-20 have been withdrawn from consideration. Claims 1-3 and 5-10 are rejected. Claims 11-15 are allowed. The applicant submits the following remarks and hereby requests favorable reconsideration of the rejections.

A. Examiner's Rejections under 35 USC § 102

The Examiner's rejection of Claims 1 and 5 under 35 U.S.C. 102(b) as being anticipated by Prevey, III (U.S. Patent 6415486) is respectfully traversed.

A reference anticipates a claimed invention when the reference teaches "every aspect of the claimed invention, either explicitly or impliedly." MPEP 706.02. When a cited reference does not explicitly or impliedly teach a feature, that feature must be inherently present in the cited reference in order to anticipate the claimed invention. MPEP 706.02. Applicant contends that Prevey, III does not teach or otherwise contain all the limitations of Claims 1 and 5.

With respect to previously amended Claim 1, the applicant submits that Prevey, III does not teach, either expressly or impliedly, every aspect of Claim 1 of the subject application. More specifically, Prevey, III does not contain any teaching directed to performing multiple operations of inducing compressive residual stress "in a single pass" of the burnishing tool.

Claim 1, as amended, provides:

"A method of inducing residual compressive stresses in the surface of a part comprising the steps of:

in a single pass,
performing a first operation to induce deep compressive surface stresses along a portion of the surface of the part; and

Appl. No. 10/759,954

performing a second operation to induce a more shallow compressive surface stresses along a portion of the surface of the part.”

Prevey, III does not explicitly, impliedly, or inherently teach the limitation of Claim 1 of the subject patent of “*in a single pass, performing a first operation* to induce deep compressive surface stresses along a portion of the surface of the part; and *performing a second operation* to induce more shallow compressive surface stresses along a portion of the surface of the part.” Prevey, III teaches a burnishing apparatus and method for inducing compressive residual stress in the part. While Prevey, III does disclose inducing a deep layer of compressive residual stress in the surface of the part and a shallow layer of compressive stress in the surface of the part, this would require at least two passes of the burnishing tool disclosed in Prevey, III. Therefore, the subject patent is patentably distinguishable over Prevey, III as the current invention is capable of inducing both a deep and a shallow layer of compressive surface stresses with a *single pass of the tool over the surface of the part.*

Further, Prevey III teaches the use of a secondary process, such as shot peening, grit blasting, tumbling or other similar abrasive impact processes to induce a shallow layer of compressive residual stress near the surface of the part following burnishing (col. 8, lines 1 - 7). Thus, Prevey III teaches using a secondary process, and does not disclose performing the operation in a single pass. Thus, the process taught and described in the subject application requires significantly less time and cost than would typically be required for the method of Prevey III. Accordingly, all of the limitations of Claim 1 is not shown in Prevey III, accordingly, Claims 1 and 5 are not anticipated by Prevey III.

Finally, in rejecting Claims 3 and 6 – 10, the Examiner has stated “Prevey, III teach the limitation *except* the steps of: performing a first operation to induce deep

Appl. No. 10/759,954

compressive surface stresses along a portion of the surface of the part; and performing a second operation to induce more shallow compressive surface stresses along a portion of the surface of the part.” Detailed Action of July 11, 2006, pp. 2-3 (emphasis added). Therefore, if Prevey, III does not teach these steps, as the Examiner has stated, then Prevey, III cannot anticipate Claim 1 of the subject patent as it does not teach or otherwise contain all the limitations of Claim 1.

With regard to Claims 2, 3, and 5-10, any claim that depends from an allowed claim may also be allowed. *See Ex Parte Ligh*, 159 USPQ 61, 62 (Bd. of Pat. App. & Inter. 1967). Therefore, provided that the Examiner has found persuasive Applicant’s arguments in traverse of the rejection of Claim 1, the Applicant respectfully submits that Claims 2, 3, and 5-10, all of which depend from Claim 1, are in proper condition for allowance and requests favorable reconsideration of these claims.

B. Examiner’s Rejections under 35 USC § 103

In establishing a prima facie case of obviousness, three criteria must be met:

- i. Some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; and
- ii. A reasonable expectation of success; and
- iii. The prior art reference (or references when combined) must teach or suggest all the claim limitations.

MPEP § 2143. The Examiner has not established a prima facie case of obviousness with respect to Applicant’s claims 2, 3, and 6 – 10.

1. Claims 3 and 6-10

The Examiner’s rejection of Claims 3 and 6 – 10 under 35 U.S.C. 103(a) as being unpatentable over Prevey, III in view of James et al. (U.S. Patent 6926970) is respectfully traversed.

Appl. No. 10/759,954

At paragraph number 4 of the Detailed action of July 11, 2006, the Examiner states "Claims 3, 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prevey, III in view of James et al. (U.S. Patent 6926970)." In applying James et al. to the rejection of Claims 3, 6-10, the Examiner refers to "Claim(s) 1 and 3 – 10." Thus it is not clear which claims the Examiner is rejecting under 35 U.S.C. 103(a) as being unpatentable over Prevey, III in view of James et al.

Assuming that the Examiner's rejection is applicable to Claims 3 and 6 – 10, as paragraph number 4 suggests, the Examiner has not established a prima facie case of obviousness.

As discussed hereinabove with respect to Claim 1, Prevey, III does not teach or otherwise disclose the limitation of inducing a deep layer of compressive residual stress and a shallow layer of compressive residual stress in the surface of the part *in a single pass*. Inducing a deep layer and a subsequent shallow layer would require multiple passes of the tool disclosed in Prevey, III to achieve the desired results. The Applicant respectfully submits that he is unable to find in Prevey III the benefits of such multiple passes. Indeed, in the Summary section of Prevey III, it states:

"In another preferred embodiment of the invention, a method of inducing a layer of compressive stress in the surface of a part comprises the steps of inducing a deep layer of compression within the surface and inducing a more shallow layer of compressive stress within the surface of the selected region." (col. 3, lines 62 - 67).

However, as more fully described in the Detailed Description of the Preferred Embodiment in column 8, lines 1- 7 (and elsewhere):

Appl. No. 10/759,954

"...the method of inducing a layer of compressive residual stress along the surface of the part includes the step of using a secondary process, such as shot peening, grit blasting, tumbling or other similar abrasive impact processes to induce a more shallow layer of compressive residual stress near the surface of the part following burnishing."

Thus, Prevey III does not disclose or teach a single pass process. As such, Prevey III does not teach or otherwise suggest all the limitations of Claims 3 and 6 through 10 of the subject patent, all of which depend from Claim 1 and incorporate all the limitations of Claim 1.

With regard to James et al., the Applicant is unable to find any teaching of performing a first operation to induce deep compressive surface stresses along a portion of the surface of the part; and performing a second operation to induce a more shallow compressive surface stresses along a portion of the surface of the part. Indeed, it appears that the second operation that has been identified by the Examiner is the use of a cutting tool structured to remove flash from the weld joint and the surface of the workpiece adjacent to the weld joint to thereby provide a structural assembly having a relatively smooth finished surface (Col 9, lines 5 - 9). Thus the secondary operation is to remove flash caused by the welding process and there is no teaching or suggestion that a more shallow layer of compressive stress is induced into the surface of the workpiece. Further, such removal of flash would not inherently provide such shallow layer of compressive stresses.

With respect to Claim 6, the Applicant submits that the cited references, Prevey, III and James et al., do not teach, either expressly or impliedly, the limitation of the temperature of the surface of the part during the first operation is of a first temperature and the temperature of the surface of the part during the second operation is of a second

Appl. No. 10/759,954

different temperature. Of the various references cited by the Examiner in rejecting Claim 6, only col. 11, line 60 – col. 12, line 2 of James et al. makes specific reference to temperature. This reference to temperature at col. 11, line 60 – col. 12, line 2 does not teach or suggest performing a second operation at a second temperature, but is instead a reference to the physical properties possessed by a part burnished at one temperature and *exposed* to a second, elevated temperature as during operation of the part. Neither Prevey, III nor James et al. contain any teaching or suggestion directed at performing a second operation to induce compressive stresses at a second temperature. Therefore, Claim 6 of the present application is patentably distinguishable over Prevey, III in view of James et al.

With respect to Claim 7, the Applicant submits that the combination of Prevey, III in view of James et al. does not teach, either expressly or impliedly, every aspect of Claim 7. More specifically, neither Prevey, III or James et al. teach or otherwise suggest the limitation of performing a first operation to induce deep compressive surface stress along a portion of the surface of a part and performing a second operation to induce more shallow compressive surface stresses along a portion of the surface of a part *where the first and second burnishing operations are performed with burnishing members having differing moduli of elasticity.*

In rejecting Claim 7, the Examiner has made specific references to James et al. However, these references are devoid of any reference, express, implied or inherent, to burnishing members with different moduli of elasticity. Further, James et al., taken in its entirety, does not contain any discussion of modulus of elasticity as applied to burnishing members or otherwise. The same is true of Prevey, III. As such, Claim 7 is patentably

Appl. No. 10/759,954

distinguishable over Prevey, III in view of James et al. as neither reference teaches or suggests any limitation with respect to moduli of elasticity.

2. Claim 2

The Examiner's rejection of Claim 2 as being unpatentable over Prevey, III in view of foreign patent publication SU701777 is respectfully traversed.

Claim 2 depends from Claim 1 and therefore incorporates every limitation of Claim 1. The Applicant restates the arguments made hereinabove with respect to independent Claim 1. Neither Prevey, III nor '777 contain the limitation of "in a single pass, performing a first operation to induce deep compressive surface stresses along a portion of the surface of the part; and performing a second operation to induce more shallow compressive surface stresses along a portion of the surface of the part." Therefore, the Applicant respectfully submits that the combination of Prevey, III and '777 does not teach or suggest all of the claim limitations of applicants' Claim 2 and there is no suggestion or motivation in the cited references to combine or modify either reference to read on the Claims of the subject invention. As such, the Examiner has failed to establish a prima facie case of obviousness with respect to applicant's Claim 2.

Further, Applicant's Claim 1, from which Claim 2 depends, states that a first operation is performed to induce a deep compressive surface stress and that a second operation is performed to induce more shallow compressive surface stresses. The '777 reference does not teach the limitation of treating or burnishing a part to induce compressive surface stresses, either deep or shallow. Instead, the '777 reference is directed to treating a part to improve the surface finish. Treating to improve the surface finish need not include inducing compressive residual stress and may actually cause

Appl. No. 10/759,954

tensile residual stresses to develop in the part. As such, there is no teaching or suggestion in the '777 reference or Prevey, III of performing an operation to induce a deep compressive surface stress and performing a second operation to induce a more shallow layer of compressive surface stress in a single pass of the treatment apparatus. Therefore, the combination of references does not teach or suggest all the claim limitations of applicant's Claim 2.

The Applicant submits that while the '777 reference teaches using burnishing members having different diameters *for improving the surface finish of a part*, there is no showing that one skilled in the art would be motivated to combine the teachings of the '777 reference with the method of Prevey, III to provide for deep and shallow compressive residual stresses. Further, there is no teaching in either reference that the use of burnishing members of different diameters would be effective for introducing deep and shallow compressive residual stresses.

Even if all of the elements of the claim are disclosed in the cited references, which they are not, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art as to why one of ordinary skill would have been prompted to combine the teachings of the references to arrive at the claimed invention. The cited references do not contain any suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art, to modify the reference or to combine references and the Examiner has not provided any showing of such **motivation or teaching**. Therefore, this element of the *prima facie* case of obviousness has not been established with respect to applicant's Claim 2.

Appl. No. 10/759,954

In view of the foregoing Remarks, Applicant respectfully requests reconsideration of the Application and that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



Mark F. Smith
Attorney of Record
(Reg. No. 32,437)

September 11, 2006

Smith Brandenburg & Novak Ltd.
905 Ohio-Pike
Cincinnati, Ohio 45245
(513) 752-5350 (Phone/Fax)
marks@sbtechnologylaw.com (Email)